A. Title: Application for Permit for Scientific Purposes under the Endangered Species Act of 1973

Project Name: Willamette Floodplain Restoration Project

B. Species: Upper Willamette Chinook Salmon ESU (*Onchorhynchus tshawytscha*), Upper Willamette Steelhead ESU (*Onchorhynchus mykiss*)

C. Date of Permit Application: June 8, 2006

D.1. Applicant Identity: Stanley Gregory, Professor

D.2. Agency: Oregon State University
Department of Fisheries and Wildlife

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Corvallis, OR 97331

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D.1.1. Contact Identity: Randall Wildman, Senior Faculty Research Assistant

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Corvallis, OR 97331

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D.6.6 Contact email: randy.wildman@oregonstate.edu

E.1. Principle Investigators: (Resume at end of document)

Stanley Gregory 541-737-1951

Field Supervisor: (Resume at end of document)

Randall Wildman 541-737-1967

E.2. Field Personnel:

Stanley Gregory	541-737-1951
Randall Wildman	541-737-1967

E.3. Funding Source

USDA Natural Resources Conservation Service
National Business Management Center
P.O. Box 6567, FWFC, Bldg.23
501 Felix Street
Ft. Worth, TX 86115-0657

Cooperating Institutions:

Department of Fisheries and Wildlife
Oregon State University
104 Nash Hall
Corvallis, OR 97331-3803

Institute for a Sustainable Environment
Department of Landscape Architecture
University of Oregon
Eugene, OR 97403-5234

E.4. Contractors

Not applicable-No contractors will be used

E.5. Disposal of Dead Specimens

All dead fish will be preserved, cataloged and stored in the Oregon State University Fish Collection located in the basement of Nash Hall. This museum is under the direction of Dr. Douglas Markle (541-737-1970). The museum will lend specimens to any interested group, both public and private, for short-term loan. If large quantities of specimens are available, permanent loans can be arranged. The address for the museum is:

Oregon State University Fish Collection
Department of Fisheries and Wildlife
104 Nash Hall
Corvallis, OR 97331

E.6. Transport and Long-term Holding

Not applicable-No fish will be transported or held long-term

F. Project Description, Purpose, and Significance

F.1. Justification of the objectives(s):

The NRCS has created a Wildlife Habitat Management Institute that is dedicated to the development and dissemination of fish and wildlife management technology for the agency. OSU, and specifically the Department of Fisheries and Wildlife, is dedicated to the education and research of fish and wildlife ecology and management. Cooperation between the Institute and researchers of the Department will allow state-of-the-art technology to be developed and scientifically validated, for use in field and state offices of NRCS to plan and implement ecologically-sound conservation practices for fish and wildlife habitats on non-federal lands.

Oregon State University will conduct research to evaluate specific floodplain and riparian restoration actions and test effectiveness of newly developed landscape assessment tools for use in natural resource conservation planning. The purpose of this research would be to "translate" findings of the Pacific Northwest Environmental Research Consortium's Alternative Futures Analysis of the Willamette River to the design and application of site-specific actions for restoring floodplain processes and improving aquatic habitats. Objectives include evaluating the effect of restoration and conservation actions implemented in riparian areas and floodplains on riparian function and aquatic species, and determining the degree (% age of the channel/floodplain forest) to which restoration actions must be implemented to effectively restore ecological processes and contribute to salmon and steelhead recovery. This ongoing project will also initiate studies to predict and/or evaluate restoration project success at (1) improving riparian function, (2) protecting adjacent lands during flood events, (3) increasing connectivity of river to floodplain and backwater habitats, (4) and assessing the cumulative effects of adjacent landowner participation in improving instream habitats for fish, wetland and floodplain functions, and flood protection for private lands.

Fish assemblages: Fish communities will be sampled at 1) tributary junctions, or multiple channel reaches and single channels without lateral development and 2) with intact and altered forests. Sites will be sampled to document fish communities in reaches of NRCS restoration projects to allow for pre-implementation and post-implementation monitoring. These sites will be compared with nearby reference sites. Microhabitat relationships (e.g., wood, vegetation shorelines, pools, riffles) will be determined from field sampling. All sites will be sampled over a reach length of 1 km and the tributary junctions or side channels will be located in the middle of the 1-km reach. Sampling duration and effort will be standardized so that relative abundances can be calculated for measures of evenness and H', realizing that gear selectivity and differential species and life history vulnerability to capture will affect estimates. Habitat characteristics (large wood, depth, velocity. substrate, water chemistry) will be measured for major reach types and type of habitat alteration. Tumors, lesions, and abnormalities are consequences of environmental contamination and may be related to urbanization and agricultural chemical use. Fish sampling along the river will record frequency and types of abnormalities and relate these patterns to land use practices and point source discharges within the floodplain. In addition, relative composition of native and exotic fish species in different reach types and habitats will be determined as an additional measure of human impact and habitat alteration.

F.2. Federal Agency Relationship

The proposed project evaluates research applications for restoring riparian and river ecosystem components considered favorable to the recovery of native salmon populations of the Willamette River. Therefore the project responds directly to the policy of the Natural Resources Conservation Service to acquire the technology, knowledge and information resources necessary to implement ecosystem-based fish and wildlife habitat restoration and management (USDA-NRCS 510.11d)

F.3. Broader significance and large-scale restoration research

The proposed project was designed in response to large-scale research being conducted by the Pacific Northwest Ecosystem Research Consortium to identify conservation-based management options for the Willamette River (Willamette Basin Alternative Futures Analysis, 2001). In addition, the project responds to actions identified in the Willamette Restoration Strategy of the Willamette Restoration Initiative (February 2001). Rigorous validation of restoration research applications is needed before NRCS encourages broad use of these types of management tools to restore large riverine ecosystems.

F.4. Relationships with other projects

Fish population and habitat data, and riparian forest and floodplain data being collected at the project sites will be used to assess responses to restoration actions and will also be useful for other studies being conducted concurrently to complete a basin-wide assessment of river habitat conditions and community structure (S. Gregory, principal investigator).

F.5. Justification for using listed species

The study does not "use" listed species per se. In the course of field sampling to determine what fish species are using various habitats and how they respond to restoration actions, listed species may be encountered. No attempt will be made to capture adult listed fish species.

G. Project Methodology

G.1. Duration of Project

The proposed duration of this project is from April 1, 2007 to October 30, 2011. Boat electrofishing will be conducted from June to October of each year. An interim report of data and findings at the close of FY 2007 will be provided and a final report in the format of an NRCS Tech Note will be provided upon the completion of the research project in FY 2011.

G.2.a. Procedures and Techniques

NMFS protocols in the "Guidelines for electrofishing waters containing salmonids under the endangered species act" will be incorporated into all field sampling.

Electrofishing will be conducted with the use of a 23 ft Alumaweld Electroshock Jet Sled equipped with a 150 HP Mercury outboard engine. The shocking unit on the boat is a Coffelt Model VVP-2E with 5000 watt with pulsed DC output. The power source is a Honda EM3500X gas powered generator. The electrofishing crew will consist of 4 people: boat operator, bow netter, and one netter on each side of the boat.

The length of river to be electrofished at each site will be a total of 1000 meters. Each sampling site will be divided into five separate 200-m sampling reaches. All fish obtained within a 200-m reach will be processed, recorded separately, and released before a new 200-m reach is sampled. Each 200-m reach will be sampled in a downstream direction with one pass of the electrofishing boat.

The electrofishing boat will be maneuvered so that it is 2 to 3 meters from shore, near cover structures, and at depths less than 3 m wherever possible. Time duration to electroshock the 200-m reach will be recorded and the sampling site will be scaled by the shoreline distance and will be quantified by dominant habitat types. If a swimmer or another boat is encountered, the shocking current will be cut and the boat will be negotiated around the hazard or wait for the hazard to pass. All stunned fish with the exception of adult listed species (see next paragraph) will be netted and placed in an aerated live well. After the 200-m reach is sampled, all fish in the live well are identified to species, measured for total length, and inspected for any external abnormality. All fish are released as quickly as possible into the immediate area where they were captured.

In the rare case when an adult listed fish is encountered, the netters in the bow of the boat will signal the presence of an adult listed fish using both verbal and hand signals. The bow netter and/or the boat operator will immediately break the circuit and the electrofishing field will be terminated. **No attempts will be made to net or capture any adult listed fish species**. If an adult listed fish is encountered in any 200-meter reach, the sampling will be terminated and an alternate 200-meter reach will be selected. If a stunned adult is encountered that is incapable of self-righting, then they will held in the river with dip nets until they can swim away.

G.2.b. Sampling schedule:

June – Oct. 2007; June – Oct. 2008, June – Oct. 2009, June – Oct. 2010, June – Oct. 2011

Each sampling season starts at the most upstream sampling site and moves downstream as the summer progresses. The upstream most sampling site is the Willamette River, confluence with the McKenzie River, River Mile 174.7. The lower most sampling site is Willamette Falls. The majority of sampling will take place at 5 specific sites between the towns of Peoria and Harrisburg. Other sampling sites and reference sites between River Mile 174.7 and River Mile 27.0 are under investigation and have not been specifically determined. The latitude and longitude of the 5 specific sites are:

Site 1: Norwood Island 44.23.09 N, 123.14.69 W

Site 2: Horning Revetment	44.23.15 N, 123.14.51 W
Site 3: Horning CREP	44.23.44 N, 123.13.64 W
Site 4: Meissner Property	44.25.19 N, 123.13.40 W
Site 5: Dyksterhuis	44.25.99 N, 123.13.71 W

G.2.c. Description of any tags:

Not applicable-No fish will be tagged or marked in any way

G.2.d. Use of any drugs:

Not applicable- No drugs will be used on any fish

G.2.e. Temporary holding:

No attempt will be made to net or capture adult listed fish species. All other fish species will be held in an aerated livewell onboard the boat until the 200-meter reach is completely sampled. Any captured juvenile listed fish will be processed first and be released before non-listed fish are processed. All other salmonids (not listed) will be processed next and then non-salmonid species will be processed. Processing of fish includes identifying the fish to species, measuring the fish for total length, and examining the fish for any external abnormality. All fish are released into the area in which they were captured after they have been processed.

G.2.d. Samples to be taken from each individual:

Not applicable-No samples will be taken from any fish

G.3. Possible alternatives:

The relative size of the Willamette River and the depth of the water column preclude the use of backpack electrofishers. A boat electrofisher is the only system available for obtaining the information needed in such a system.

G.4. Potential for injury or mortality and steps to minimize adverse effects

Although we are not attempting to net any adult listed species there still exists the danger that the boat electrofishing will cause mortality or harm to adult listed species present in the waters sampled. This project is active in training personnel in the principles of electrofishing, reducing the likelihood of encountering listed species, and if listed fish are encountered then what steps can be taken to reduce the risk during such encounters. Below are steps taken by this research program to minimize the adverse effects to listed fish species by boat electrofishing:

- Randall Wildman (Field Supervisor) will be present at all field sampling. He attended the course entitled "Principles and Techniques of Electrofishing" held April 14-16, 1999 in Vancouver, Washington. This is a three-day course covering in detail all aspects of electrofishing. The course is conducted by Washington State University – Vancouver Continuing Education and Smith Root, Incorporated.
- The field supervisor as well as other field personnel are required to read and understand the following publications: Wisconsin Department of Natural Resources, 1974; Bayley and Dowling, 1993; Reynolds, 1996; Survey Protocol Training – Stream Typing, 1997; Smith Root, 1999.
- Randall Wildman has 27 years of experience in electrofishing with the Wisconsin Department of Natural Resources, United States Fish and Wildlife Service, and Oregon State University-Department of Fisheries and Wildlife. Mr. Wildman has worked closely with personnel from Oregon Department of Fish and Wildlife for the past 21 years on various projects involving the use of both backpack and boat electrofishers.
- NMFS protocols in the "Guidelines for electrofishing waters containing salmonids under the endangered species act" will be incorporated into this research project. Many protocols for backpack electrofishing in this reference can be applied to aspects of boat electrofishing.
- Before any electofishing is conducted, the conductivity of the water is analyzed using a Lab-Line Lectro MHO-Meter Model MC-1, Mark 5. Water temperature is also measured before any sampling is conducted. Conductivities obtained from sampling in 1998 and 1999 on the Willamette River ranged from 66 to 260 μmhos in multiple channel sites and ranged from 68 to 150 μmhos in single channel mainstem sites.
- All field personnel are required to wear polarized sunglasses for optimal sighting of fish and quick recognition of adult listed fish species.
- All field personnel are well versed in the identification of fish species (Wydoski and Whitney, 1979) so that they may recognize the presence of adult listed species and immediately terminate the electric circuit.
- All setting on the electrofisher are recorded at the end of each run and logged into our database.
- All members must be well versed in communicating with other field member with both voice and motion signals. Noise from generators and outboard motors require that hand signals are well understood by all crew members.
- The level of sampling is at the lowest level possible to detect differences in species richness for this project and yet minimize the harm to listed fish species.
- The proposed areas for sampling with this application have been previously sampled by our research team in 1998 and 1999. From this previous sampling, we have an excellent understanding of areas and habitats that contain high densities of listed species. These areas will be avoided during any future sampling.
- We typically start with the lowest possible settings on the electorfisher and only raise the setting if fish are actively escaping the field around the umbrella electrodes. Depending on water conductivity and temperature, starting setting are: DC pulsed, pulse frequency of 40 Hz, pulse duration of 5 milliseconds, voltage setting is normally at 600 volts giving a current typically in the range of 3 to 4 amps.
- Mortality to juvenile salmon and steelhead is possible with this study but all reasonable measures are taken to eliminate any mortality. Electrofishing equipment is kept in excellent working order, fish are netted as quickly as possible with soft mesh nets, fish are placed in an aerated livewell onboard the boat. Water in the livewell is changed after each 200-meter sampling reach. These measures have been successful in

sampling conducted in 1998 and 1999 with no mortalities being encountered for both Chinook salmon and steelhead.

- **As stated before, if adult listed fish species are encountered in any 200-meter electrofishing reach, the current is immediately cut and all shocking activities within the reach are terminated. No attempt is made to capture or net adult listed fish unless the fish can not right itself. The reach is not resampled and an alternate sampling reach will be selected.**

H. Description and Estimates of Take:

H.1. Recent status and trends:

Chinook salmon (*Onchorhynchus tshawytscha*) Upper Willamette River ESU
Steelhead (*Onchorhynchus mykiss*) Upper Willamette River ESU

Upper Willamette River chinook salmon (*Onchorhynchus tshawytscha*) were listed as threatened by the National Marine Fisheries Service in March of 1999. Kostow (1997) lists 5 spring-run populations presently in the gene conservation group and 4 spring-run populations now extinct in the region. Historically, spring Chinook were only present in tributaries that drain from the Cascade Mountains into the Willamette River. Populations presently are restricted in their distribution due to the presence of 6 dams on these Cascade Mountain drainages. Hatchery stocks are not included with this ESU.

Upper Willamette River steelhead (*Onchorhynchus mykiss*) were listed as threatened by the National Marine Fisheries Service in March of 1999. Kostow (1997) currently lists 9 winter-run populations in this gene conservation group. Data from fish counts at Willamette falls indicate that populations from tributaries of the Willamette above the falls have dropped to record lows in the 1990's. Counts of approximately 3,000 fish have been reported recently passing Willamette Falls. These population declines have been attributed to large urban and agricultural development in the Willamette basin. Other factors leading to this decline include water quality problems, reductions of discharge, extensive channelization and reduction of off-channel rearing habitat.

H.2. Estimates of potential annual mortality

Extensive boat electrofishing on the mainstem Willamette River by OSU Fisheries and Wildlife personnel in 1998 and 1999 produced no mortality of adult or juvenile chinook salmon and no mortality of adult or juvenile steelhead. Other researchers have seen mortality rates in the range of 5% for rivers of similar to smaller size (McMichael et al 1998). We have applied a 5% indirect mortality to the amount of take since the number of individuals is small in sample size. This 5% mortality is applied to indirect take only. There will be no intentional (direct mortality). In the event that mortality of a listed species is encountered, all sampling would be terminated and NMFS would be notified as quickly as possible. Information obtained from any mortality

would be reported and could lead to further understanding of the effects of boat electrofishing on listed species

H.3. Detail of how take estimates were arrived

Take estimates were calculated using data obtained from a three year EPA funded project entitled "Ecological, Demographic, and Economic Evaluation of Opportunities and Constraints for Riparian Restoration". Randall Wildman was the field supervisor for this project and he will be the field supervisor for the project associated with this application. The Willamette River was sampled in both 1998 and 1999 from River Mile 175.4 downstream to River Mile 0.0. The same methods of collection were used in both 1998 and 1999. Fish data collected from these two years of sampling was used to calculate the "anticipated take table". In generating the number of individuals for "take" the greatest number of individuals obtained in 1998 or 1999 was used. During the sampling conducted in 1998 and 1999 there was no observed mortality of any adult or juvenile Chinook salmon and no observed mortality of any adult or juvenile steelhead.

H.4. USFWS listed species

No USFWS listed species (such as bull trout) will be taken.

I.1. T Transportation of a listed species

Not applicable- No fish will be transported. All fish are released.

I.2. Holding of a listed species

Not applicable- No fish will be held. All fish are released.

I.3. Emergency contingencies

Not applicable- No fish will be held. All fish are released.

J. Cooperative Breeding Program:

Although no adult Chinook salmon or adult steelhead are planned to be captured we are willing to participate in the cooperative breeding program and to maintain or contribute data or samples to the program if requested.

K. Previous or Concurrent Activities Involving Listed Species:

K.1. Previous permits

NOAA Fisheries Section 10 Permit #1333
OR2006-2977 Effects of stream barbs on aquatic habitat, fish communities, and critical ecological processes
OR2006-2944 Willamette Floodplain Restoration Project
OR2005-2239 Willamette Floodplain Restoration Project
OR2004-1536 Willamette Floodplain Restoration Project
OR2003-779 Willamette Floodplain Restoration Project
OR2002-301 Willamette Floodplain Restoration Project

Above permits had the following 4 listed fish included on each of the permits.
Chinook salmon (*Onchorhynchus tshawytscha*) Upper Willamette River ESU
Steelhead (*Onchorhynchus mykiss*) Upper Willamette River ESU
Chinook salmon (*Onchorhynchus tshawytscha*) Lower Columbia River ESU
Steelhead (*Onchorhynchus mykiss*) Lower Columbia River ESU

K.2. Mortalities in the past 5 years

K.2. a. List the ESU/species, life stage, origin, etc.

No mortalities have occurred with the boat electrofisher in the past 5 years. One mortality of a listed fish has occurred in the 5 years using other gear types (beach seine). The one mortality was a Chinook salmon (Upper Willamette River ESU). The life stage was juvenile and the origin was a native fish (adipose fin intact).

K.2. b. List the number and cause

The number was one mortality and the cause of the mortality was due to crushing when a piece of cobble was entrained in the beach seine along with the juvenile Chinook.

K.2. b. Describe measures taken to diminish or eliminate such mortalities
Before sampling is started, crew member are instructed that if a foreign object such as a boulder or piece of cobble is entrained within the beach seine all pulling of the net is immediately stopped until the object is removed. We have not had any mortality of listed species since we have used these measures.

L. Certification:

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA."

Randall Wildman Date: 13 June 2006

Signature

Randall Wildman Senior Faculty Research Assistant

Name and Position Title

M. Length of Time and Cost to Prepare Application

The length of time to complete this application was approximately 30 hours. The cost for completing this application was $750.

Anticipated Annual Take

Use this table to specify anticipated types and numerical estimates of annual take for listed species during individual research or enhancement activities. Use a separate table for each discrete project or location **and label tables accordingly**. Each row must be explained in the application. All mortalities must be justified.

Location/Project:_Willamette River (River Mile 27 to 175)_____

ESU/ Species and population group if appropriate	**Life Stage**	**Origin**	**Take Activity**	**Number of Fish Requested**	**Requested Unintentional Mortality**	**Research Location**	**Research Period**
Chinook Salmon/ Upper Willamette ESU (*Onchorhynchus tshawytscha*)	Adult	Naturally Produced** (see footnote)	Capture, handle, and release	10	0	Willamette River (River Mile 27-175)	June-October
Chinook Salmon/ Upper Willamette ESU (*Onchorhynchus tshawytscha*)	Adult	Artificially Propagated (Clipped Adipose fin)	Capture, handle, and release	5	0	Willamette River (River Mile 27-175)	June-October
Chinook Salmon/ Upper Willamette ESU (*Onchorhynchus tshawytscha*)	Juvenile	Naturally Produced** (see footnote)	Capture, handle, and release	9	0	Willamette River (River Mile 27-175)	June-October
Chinook Salmon/ Upper Willamette ESU (*Onchorhynchus tshawytscha*)	Juvenile	Artificially Propagated (Clipped Adipose fin)	Capture, handle, and release	9	0	Willamette River (River Mile 27-175)	June-October
Steelhead Upper Willamette River ESU(*Onchorhynchus mykiss*)	Adult	Naturally Produced	Capture, handle, and release	6	0	Willamette River (River Mile 27-175)	June-October

Steelhead Upper Willamette River ESU(*Onchorhynchus mykiss*)	Juvenile	Naturally Produced	Capture, handle, and release	4	0	Willamette River (River Mile 27-175)	June-October

** Since we can not tell the difference between natural fish and fish that were artificially propagated that did not have their adipose fin removed, they have been combined into one row. Close to 100% of all artificially propagated juvenile Chinook have their adipose fin removed but in the remote chance that a juvenile Chinook from a hatchery was release with it's adipose fin intact, we have combined these two types of fish.